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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF HIGHGATE

in the

COUNTY OF KENT

1967

STANDARDS DEVELOPMENT BRANCH OMOE
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VILLAGE OF HIGHGATE
COUNTY OF KENT
1967

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Report on a water pollution
survey of the village of
Highgate, county of Kent.
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REPORT
ON A
WATER POLLUTION SURVEY
OF THE
VILLAGE OF HIGHGATE
COUNTY OF KENT
1967
DISTRICT ENGINEERS BRANCH
DIVISION OF SANITARY ENGINEERING.

ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION

A water pollution survey in the Village of Highgate was performed in the summer of 1967. The purpose of the survey was to aid the municipality in locating any existing and potential sources of pollution and to make recommendations regarding its abatement.

Mr. L. McAskele, Clerk-Treasurer, supplied information pertinent to the survey.

GENERAL

The Village of Highgate, with an assessed population of 423 (1967 Municipal Directory), is situated near the eastern limits of Kent County, just South of Highway #401.

In general, drainage from the village is in a northerly direction with discharge into Ardwell Creek, a tributary of the Thames River. Local drainage is effected by means of open ditches, tile drains and a storm sewer locally known as the Highgate Drain.

WATER SUPPLY

Water is presently obtained from individual wells and from four larger private systems servicing some homes. These water supply systems consist of; the Smith Well, the Grant Well, the Tape Well and the Pure Water Supply. None of the above mentioned sources impart treatment to their water prior to distribution to consumers.

WATER POLLUTION CONTROL

(1) Sewage Treatment Facilities

The Village of Highgate does not have a municipal sewage collection and treatment works. Individual septic tank systems are utilized to dispose of sanitary wastes.

Information obtained at the time of the survey indicated that some septic tank systems were not operating efficiently. Consequently this has resulted in the discharging of inadequately treated sanitary sewage into the local storm and surface water drainage system.

(2) Industrial Waste Disposal

The village does not have any industries which produce large volumes of wastewater requiring treatment.

(3) Refuse Disposal

Refuse from Highgate is disposed of at a township site located in the Township of Oxford, Concession 5, Lot 4. The operation includes burning, trenching and covering.

The refuse disposal area is not located near a watercourse and at the time of the inspection there appeared to be no evidence of surface water runoff from the site. The site seemed to be well operated and no pollution problems, attributed to the operation of the site, are anticipated for the present.

SAMPLING PROCEDURES

Water samples were collected, where possible from representative points in the Village of Highgate storm and surface water drainage system . These samples were then submitted to the regional OWRC laboratory in London Ontario for sanitary chemical analyses and bacteriological examination. The laboratory results were then tabulated and appended to this report. (Table I)

The locations of sampling points are plotted on the accompanying map.

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

Bacteriological Examination

The membrane filter (MF) technique is employed at OWRC Laboratories to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres (ml) of the sample.

The presence of coliforms may indicate pollution from both faecal and non-faecal sources while E.coli organisms indicate pollution of intestinal origin only. The maximum limit of 2,400 coliform organisms per 100 millilitres is the objective for bacteriological quality of surface water in Ontario.

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

The BOD of sewage or polluted waters is the oxygen required during stabilization of the decomposable organic material by aerobic biochemical action. A five-day BOD determination with

incubation at 20 degrees Centigrade is reported. A high BOD is indicative of organic or chemical pollution. A desirable upper limit in surface water is four (4) parts per million (ppm) while the objective maximum in waste discharges to a watercourse is 15 ppm.

Solids

The value for total solids expressed in parts per million (ppm) is the sum of the values for the suspended and dissolved matter in water. The concentration of suspended solids, which indicates the measure of undissolved solids of organic or inorganic nature is generally the most significant of the solids analyses in regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, deposition in streams, and injury to the habitat of fish. The OWRC's objective for discharge, is a suspended solids concentration of not greater than 15 ppm.

Alkyl Benzene Sulfonate (ABS) (Anionic Surfactant)

The surfactant is a synthetic organic chemical which is used as a principal ingredient of modern household detergents. The popular use of synthetic detergents for general cleaning purposes has resulted in the incidence of residual ABS in waste discharges. Therefore the presence of detergents in water samples is usually an indication of pollution from domestic sources.

DISCUSSION

In general, drainage for the Village of Highgate is in a northerly direction and is provided by small tile drains and a large covered storm sewer locally known as the Highgate Drain. Owing to the fact that all of the drains are completely covered at their points of entry to the Highgate drain, samples were obtained at various points in the storm and surface water collection system in order to assess the quality of the drainage in this system. Additionally, samples were taken of the system's effluent which flows to Ardwell Creek, a tributary of the Thames River.

Results of laboratory analyses performed on the samples revealed excessive BOD, suspended solids and ABS concentrations in most cases. Bacteriological examination disclosed extremely high coliform counts in all drain samples collected.

A sample obtained from a manhole at the north-west corner of King St. and Prince St. (Sample No. 2) exhibited a BOD content of 460 ppm. The suspended solids content at 966 ppm was correspondingly high. Extremely high bacteriological counts of 155,000,000 coliforms per 100 millilitres of sample are indicative of faecal pollution. Similarly a sample collected from a manhole at the south-west corner of Main St. and Victoria St. (Sample No.5) showed considerable pollution (BOD - 1260 ppm, suspended solids - 3324 ppm and 8,900,000 coliforms per 100 ml of sample). Conditions of contamination were also noted in most of the other samples collected (See Table I appended).

When the Highgate Drain was inspected upstream of the village, it was noted that it contained little or no flow. However, when the drain was sampled both in, and downstream of, the built-up areas (Sample No. 4 & 6), and increase in flow and polluting materials was revealed as this storm drain progressed through the municipality.

As a result of the sampling programme it was concluded that sanitary sewage, due to inadequate septic tank systems, was gaining access to the municipal surface water collection system and in turn to the adjacent watercourse constituting a pollution problem.

SUMMARY

A water pollution survey of the Village of Highgate was performed for the purpose of locating any existing and potential sources of water pollution in the community. The survey was conducted in 1967 and this report is based on the results of chemical analyses and bacteriological examinations of water samples collected at that time.

The village does not have a municipal water supply system and water is obtained from individual wells and four larger private systems servicing parts of the community. There are no municipal sanitary sewers and sewage is disposed of by means of individual septic tank systems. General drainage is in a northerly direction to a tributary of the Thames River and is provided by local tile drains, open ditches and a storm sewer known as the Highgate Drain.

The results of the survey indicated that due to some inadequate septic tank systems in the village, sanitary sewage is gaining access to the municipal storm and surface water drainage system and in turn to Ardwell Creek. This constitutes a source of pollution to the watercourse. Corrective action will be required to eliminate this condition.

RECOMMENDATIONS

The Village of Highgate should institute a water pollution control programme to locate and eliminate, where possible, the discharge of polluting wastes from private sewage systems to the local municipal storm and surface water drains.

In the event that this is not feasible, the municipality should undertake a study to determine the possibility of providing a communal sewerage system.

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Prepared by

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TABLE I

VILLAGE OF HIGHGATE - WATER POLLUTION SURVEY

Sampling No.	Location of Sampling Point	5-Day BOD (ppm)	SOLIDS (ppm)			Anionic Detergents as ABS (ppm)	Coliform Count per 100 ml Membrane Filter
			Total	Susp.	Diss.		
(1)	King St. at Creek - south end of village	5.0	634	51	583	0.1	600
(2)	Manhole-King St. and Prince St.N.W. corner	460.0	29538	966	28527	1.2	155,000,000
(3)	Manhole-on Main St. (N.side) 200' W. of King St.	6.0	1812	824	988	0.1	6,700,000
(4)	Manhole-King St. 400' N. of Main St.	28.0	826	240	586	0.3	1,000,000
(5)	Manhole-Main St. and Victoria St. - S.W. corner	1260.0	4438	3324	1114	7.0	8,900,000
(6)	Manhole-Highgate drain at Main St.	9.0	714	94	620	0.2	2,200,000
(7)	Manhole-Victoria St. (E-side) 400' N. of Prince St.	No flow at time of inspection					

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

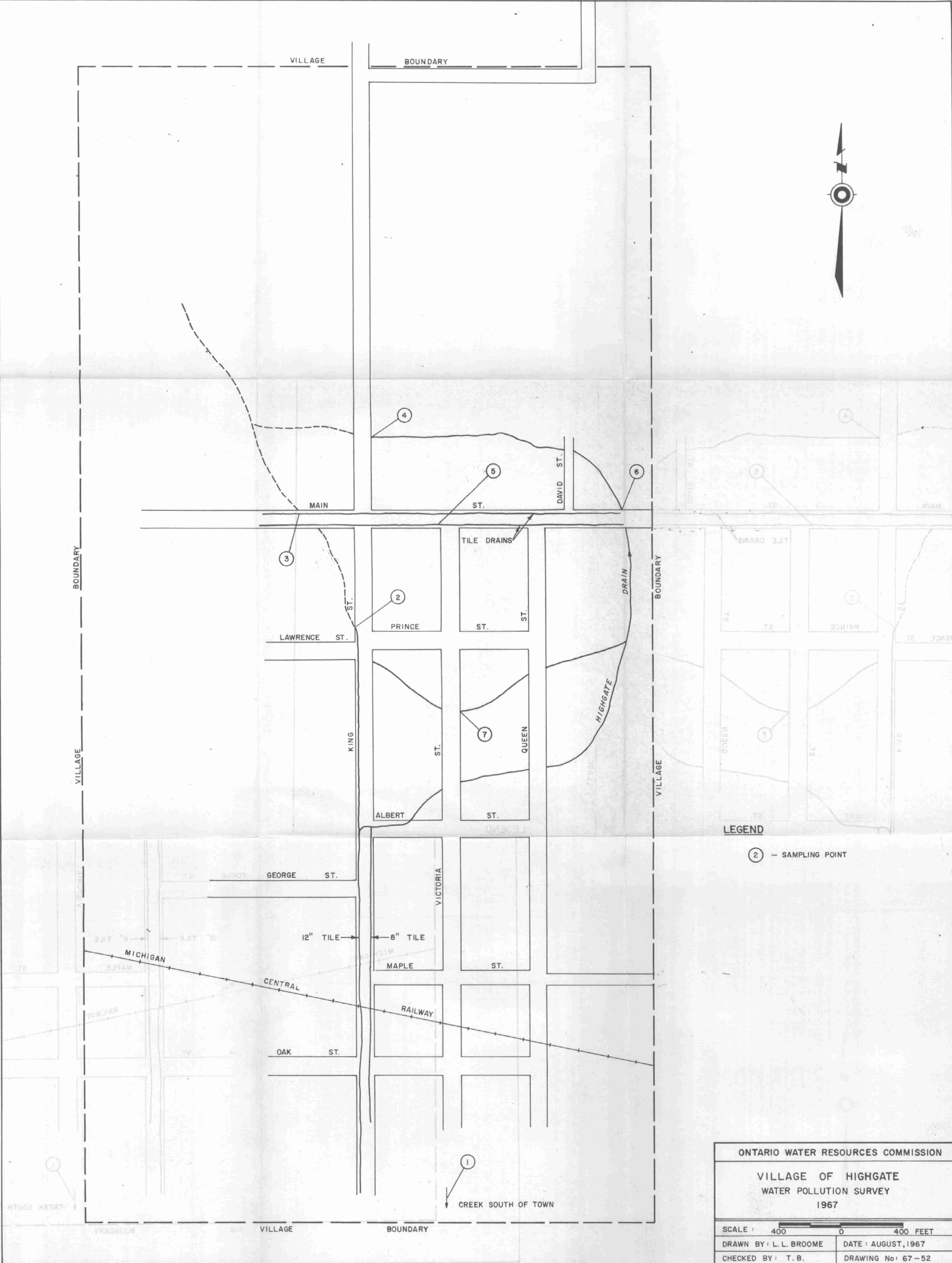
A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



LEGEND

② - SAMPLING POINT

ONTARIO WATER RESOURCES COMMISSION

VILLAGE OF HIGHGATE
WATER POLLUTION SURVEY
1967

SCALE : 400 0 400 FEET

DRAWN BY: L.L. BROOME

DATE: AUGUST, 1967

CHECKED BY: T.B.

DRAWING No: 67-52